Hazardous Substances Emergency Events Surveillance

A total of 394 events meeting the Hazardous Substances Emergency Events Surveillance (HSEES) case definition were reported during calendar year 2002 (preliminary data). Events occurred in 76 counties and the City of St. Louis **(See Figure 12C)**. Two events were threatened releases and two were actual and threatened releases, with the remainder being actual releases. Of all reported events, 51.0% (n=201) occurred at fixed facilities, while 49.0% (n=193) were transportation-related events. Methamphetamine-related activities contributed significantly to the total number of events reported (n=84, 21.3%).

The most common areas involved in fixed-facility events in which only one area was involved include indoor, non-industrial, living (residence) areas (25.9%, n=52), and storage areas above ground (21.9%, n=44). In transportation-related events, 179 (92.7%) occurred during ground transport (e.g., truck, van, or tractor), and 14 (7.3%) involved transport by rail.

Human error was the primary factor in 176 (44.7%) of the events. Illegal activity accounted for 89 (22.6%) events (primarily due to methamphetamine production), and 83 events (21.1%) were the result of equipment failure.

Figure 12C: Distribution of events by county, Hazardous Substances Emergency Events Surveillance, Missouri, 2002.

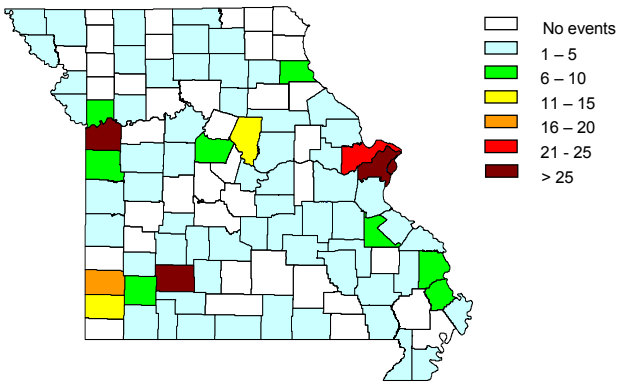

Table 2C: 10 most frequently released substances, Hazardous Substances Emergency Events Surveillance, Missouri, 2002.

Number	Standardized Substance Name	Frequency
1.	Ammonia	77
2.	Hydrochloric Acid	34
3.	Ethyl Ether	23
4.	Paint	17
5.	Solvent NOS *	17
6.	Sulfuric Acid	16
7.	Mercury	15
8.	Sodium Hydroxide	14
9.	Methamphetamine Chemicals NOS*	16
10.	Phosphorus	13
Total		242

* Not Otherwise Specified

CHEMICALS RELEASED

During 2002, 494 substances were released during the 394 HSEES events. Fixed-facility events involved the release of 281 substances, and transportation-related events involved the release of 213 substances.

Of the 16 categories into which HSEES substances were grouped, the categories of substances most commonly released in fixed-facility events were ammonia (22.4%, n=63) and acids (16.7%, n=47). In transportation-related events, chemicals categorized as "other" (17.8%, n=38) and acids (14.6%, n=38) were most frequently released.

The 10 substances most frequently released in Missouri for calendar year 2002 are listed in **Table 2C**.

The substances most frequently released may not necessarily be the most likely to result in victims (**See Table 3C**). For example, paints and dyes were released during 20 events; however, only one of these events resulted in adverse health effects. Conversely, chlorine was released in only five events, and three of these events (60.0%) resulted in adverse health effects, indicating its greater potential for immediate harm. A total of 67 individuals were injured in one event involving the release of chlorine during a transfer operation when a hose ruptured and emergency shut-off measures also failed.

Table 3C: Number of substances released in all events and events with victims, by substance category, Hazardous Substances Emergency Events Surveillance, Missouri, 2002.

Substance Category	No. of Releases	Percentage of total releases	No. of Releases with Victims	Percentage of all releases with victims	Percentage of releases in substance category
Acids	78	15.8	43	19.5	55.1
Ammonia	78	15.8	34	15.5	43.6
Bases	24	4.9	9	4.1	37.5
Chlorine	5	1.0	3	1.4	60.0
Mixtures	17	3.4	3	1.4	17.6
Other inorganic substances	72	14.6	39	17.7	54.2
Other, not otherwise specified	54	10.9	31	14.1	57.4
Paints and dyes	20	4.0	1	0.4	5.0
Pesticides	27	5.5	6	2.7	22.2
Polychlorinated biphenyls	4	0.8	0	0.0	0.0
Volatile organic compounds	82	16.6	40	18.2	48.8
Formulations	3	0.6	3	1.4	100.0
Hetero-organics	3	0.6	0	0.0	0.0
Hydrocarbons	1	0.2	0	0.0	0.0
Oxy-Organics	16	3.2	7	3.2	43.8
Polymers	10	2.0	1	0.4	10.0
Total *	494	99.9	220	100.0	44.5

*Total exceeds number of events because events at which more than one substance was released were counted more than once.

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VICTIMS

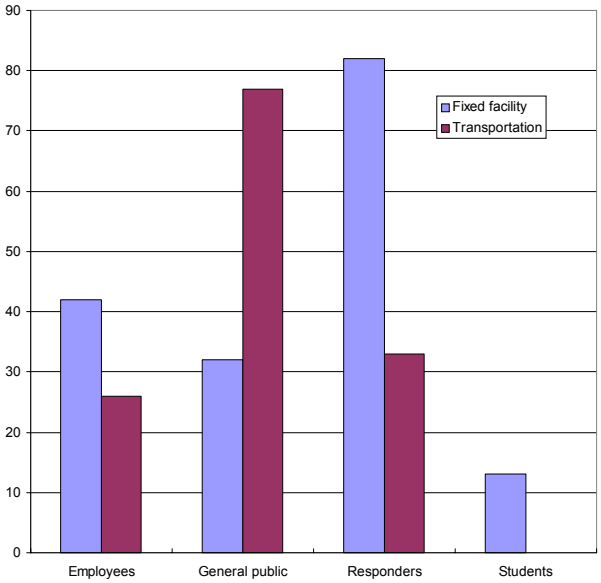
A total of 307 victims were involved in 127 events (32.2% of all events). Of the events with victims, 55.9% (n=71) involved only one victim, and 27.6% (n=35) involved two victims. Seven events (5.5%) involved five or more victims. Of the total number of victims, 171 (55.7%) were injured during fixed-facility events. For transportation events, 136 victims (44.3%) sustained adverse health outcomes.

The population groups most often adversely affected were first responders (27.3%, n=115) and members of the general public (35.5%, n=109). There were 82 first-responder victims in fixed-facility events and 33 first-responder victims in transportation-related events. Of these 115 first responder victims, 94 (81.7%) were police officers injured during methamphetamine-related events **(See Figure 13C)**.

The 307 victims sustained a total of 374 adverse health effects, as some victims had more than one adverse health effect. The most commonly reported adverse health effects were respiratory irritation (45.7%, n=171), headache (19.8%, n=74) and carbon monoxide poisoning (8.8%, n=33). A total of 151 victims (49.2%) were treated at a hospital but were not admitted; 21 (6.8%) were treated at a hospital and admitted. Injuries for 102 victims (33.2%) were reported by an official within 24 hours of the event. The majority of these injuries were self-reported by law enforcement officers responding to and/or collecting evidence from clandestine methamphetamine labs.

Of the five deaths reported in the HSEES system in 2002, four were the result of four separate motor vehicle accidents in which a hazardous substance was released; however, the deaths were due to trauma from the accident. The remaining fatality involved a disabled person who was unable to evacuate from the home during a house fire. The house fire caused several oxygen tanks to explode inside the home, subsequently causing the fatality.

Figure 13C: Distribution of victims by population group* and type of event, Hazardous Substances Emergency Events Surveillance, Missouri, 2002.



* The population group of two victims was not known.

EVACUATIONS

Evacuations were ordered in 32 events (8.1%). The number of persons evacuated was known for 28 of the 32 events. The median number of persons evacuated was 22 (range: 1-400). The length of evacuation was known for 31 of the 32 events. The median length of evacuation was 2.5 hours (range: 0.1-22.5). Six of the 32 evacuations were a result of methamphetamine-related activity. The number of people evacuated was known in five of the six events and ranged from 1 to 30. The total number of people evacuated in these five events was 96. Three of the events involving an evacuation were caused by the theft of anhydrous ammonia, two involved active residential methamphetamine labs, and one involved a mobile methamphetamine lab.

In two events, an official ordered in-place sheltering. During one of these events, an evacuation was also ordered by an official.